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U S NAVY RESPONSES TO ILLINOIS ENVIRONMENTAL PROTECTION AGENCY COMMENTS ON THE DRAFT REMEDIAL INVESTIGATION/RISK ASSESSMENT FOR SITE 12 HARBOR DREDGE SPOIL AREA NSTC GREAT LAKES IL
10/9/2012
TETRA TECH

RESPONSE TO COMMENTS
ILLINOIS ENVIRONMENTAL PROTECTION AGENCY DECEMBER 8, 2011 COMMENTS
DRAFT RI/RA SITE 12 REPORT
NAVAL STATION GREAT LAKES, GREAT LAKES, ILLINOIS

Issue Date: October 9, 2012

General Comment:

The Illinois Environmental Protection Agency (Illinois EPA or Agency) is in receipt of the Navy's Draft Remedial Investigation/Risk Assessment Report for Site 12 – Harbor Dredge Spoil Area, Naval Station Great Lakes, Great Lakes, Illinois. It was dated June 2011 and was received on July 1, 2011. The Remedial Investigation (RI) was conducted to determine the nature of fill material that was placed in the Harbor Dredge Spoil Area and to identify current or potential human health or ecological risks associated with the site. The Agency has conducted a review of the submitted report and is herein providing comments generated during that review.

Response:

Comment noted.

Specific Comments:

1) **Executive Summary, Section E.3** – The discussion presented here regarding the possible origin of contamination in the dredged sediment once again omits the potential contribution of the Navy from on-base releases. The text here should match that provided in Section 2.3 in the opening paragraph.

Response:

Agree. The text from the opening paragraph of Section 2.3 has been inserted in Section E.3 and now reads as follows:

"During harbor dredging activities in 1952 and the 1970s, dredge spoils from the boat slip area in the harbor were reportedly disposed in Site 12 (Rogers, Golden, and Halpern, 1986). The harbor area receives flow directly from Pettibone Creek, which drains storm water from the base and a number of off-base industries upstream of NSGL. The primary sources of the environmental contaminants in the harbor sediments are from upstream industrial sources (historical discharges and contamination) and storm water discharges within the Pettibone Creek Watershed. Overland runoff and storm water discharges from NSGL to Pettibone Creek may have contributed pollutants to the watershed. Recent sediment sampling performed in the creek suggests that there is no significant current point source(s) impacting the sediment quality of Pettibone Creek. However, chemicals in the runoff from past activities may have settled in the harbor sediments (Rogers, Golden, and Halpern, 1986)."

2) **Executive Summary, Section E.6** – The results presented here are only compared to Illinois EPA's Tiered Approach to Corrective Action Objectives (TACO) remediation objectives. According to the SAP, the "Project Action Limits (PALs) are set at the lowest matrix-specific, risk-based or regulatory human health screening criteria appropriate for the site." Those TACO values are not always the lowest criteria. Please review the results and the PALs (listed on Worksheet #15 of the SAP) and revise the discussion to compare the data to the agreed upon PALs.

Response:

Agree. The following text has been inserted into Section E.6:

"The Site 12 RI required the collection of chemical data to be used to characterize the site and conduct a screening level HHRA. The soil project action limits (PALs) are set at the lowest matrix-specific, risk-based or regulatory human health screening criteria appropriate for the site. The PALs for this investigation are as follows:

- USEPA, 2011. Residential Regional Screening Levels for Chemical Contaminants in Soil at Superfund Sites, developed by Oak Ridge National Laboratory (ORNL). www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm

- Illinois Pollution Control Board, 2011. Title 35 of the Illinois Administrative Code (IAC) Section 742: TACO, Appendix C, Table A, B, C, Tier 1 Soil Remediation Objectives. www.ipcb.state.il.us/SLR/IPCBandIEPAEnvironmentalRegulations-**Title35**.asp

Soil analytical results were compared to TACO, Non-TACO, and USEPA screening criteria. The summary of the exceedances compared to first the Minimum Regulatory Screening Criteria and then the TACO Ingestion and Inhalation Remediation Objectives (Residential and Industrial) is presented below."

In addition, a summary of the data exceeding the minimum regulatory criteria (i.e., PALs) has been added.

3) **Executive Summary, Section E.6** – The first and third bullet items under surface soil are basically the same, save the remediation objective value. Please review and revise as necessary.

Response:

Agree. The third bullet has been removed.

4) **Executive Summary, Section E.6** – The last bullet item under surface soil lists the heptachlor TACO remediation objective as 900 µg/kg. The proper TACO value is 100 µg/kg. However, the PAL according to the SAP is 1.6 µg/kg.

Response:

Agree. The last bullet item under surface soil now lists the heptachlor TACO remediation objective as 100 µg/kg. This section of the Executive Summary discusses the TACO exceedances only and the PAL exceedances are now discussed in the text above this.

5) **Executive Summary, Section E.6** – The last bullet item under subsurface soil lists the lead TACO residential remediation objective as both 400 and 800 mg/kg. The 800 mg/kg value is the TACO value for the Industrial Commercial ingestion soil remediation objective. The TACO value for the Construction Worker is 700 mg/kg. The PAL is listed as 107 mg/kg.

Response:

Agree. The last bullet of section E.6 has now been revised to state:

"Lead exceeded the TACO residential ingestion Soil Remediation Objective value of 400 mg/kg, the TACO construction worker ingestion Soil Remediation Objective value of 700 mg/kg, and the TACO industrial commercial ingestion Soil Remediation Objective value of 800 mg/kg at one of ten subsurface soil sampling locations (i.e., NTC12SB29 at a concentration of 845 J mg/kg)." This section of the Executive Summary discusses the TACO exceedances only and the PAL exceedances are now discussed in the text prior to this discussion.

6) **Executive Summary, Section E.7** – In several locations in this section, there is a comparison made of average contaminant concentrations to the TACO Background values. Arithmetic means are generally unacceptable for use as exposure point concentrations in human health risk evaluations. The procedures outlined in the USEPA Pro UCL user's guide should be followed. The presented discussion would be more appropriate in the uncertainty section of the risk assessment.

Response:

Agree. Sentences comparing average contaminant concentrations to the TACO Background values were removed from this section of the report.

7) **Section 3.9** – At the end of this section, there appears to be duplicate sentences discussing the location of the IDW manifests and Certificates of Disposal. Please review and revise as necessary.

Response:

Agree. The last sentence in the fourth paragraph on p. 3-9 was deleted and the fifth paragraph was merged with the fourth paragraph.

8) **Table 3-2** – Only one soil sample is reported here as being collected in the saturated zone. According to the SAP, one third of the samples were to be collected from below the water table. Please explain the lack of samples from the saturated zone.

Response:

Agree with clarification. The SAP indicated the following:

"Discrete subsurface soil samples will be collected based on visual determination by the FOL upon visual observations (staining, odor, etc.) or PID measurements. Provided groundwater is encountered, approximately two-thirds of the subsurface soil samples will be collected from the unsaturated zone, and one-third of the samples will be taken from below the water table as determined by the FOL. Subsurface soil samples will be collected from dredge spoils or in locations where staining or odors are observed."

Therefore, the Navy committed to collecting subsurface soil samples at the depths and locations determined to be the best for the project by the FOL, and did not formally commit to collecting one-third of the samples below the water table. Based on this, the sampling program met the project goals.

Table 3-2 has been modified to more clearly illustrate the sample depth selections. Three columns have been added:

- Asphalt pieces depth (bgs)
- Saturated Depth (bgs)
- Unsaturated/Saturated Interface (bgs)

PID readings at all locations were in the background range. Ten subsurface soil samples were proposed to be collected and the locations were chosen based on the following criteria to reflect a conservative approach, to collect an accurate representation of the two types of fill (land-based and lake dredge), and to have representative soil samples from the unsaturated, saturated, and the interface of the saturated/unsaturated zones.

- Five subsurface soil samples were collected where the asphalt pieces were identified.
- Of the remaining five subsurface samples, two were collected in the unsaturated zone, one in the saturated zone, and two at the interface of the saturated and unsaturated zone.

- Of all ten of the subsurface soil samples, five were collected in the unsaturated zone, one in the saturated zone, and four at the interface of the saturated and unsaturated zone.

9) **Figure 3-1** – This figure appears to be the same as Figure17-1 from the SAP. Has it been updated to show the actual sample locations as collected in the field? Also, the note has not been updated to discuss what did occur rather than what will.

Response:

Agree with clarification. Figure 3-1 reflects the one soil boring location change that was made in the field, i.e., soil boring SB-26 was shifted to the southwest due to the presence of the gravel road. Also, the parameters discussed in the note accurately reflect what was analyzed including all soil samples were analyzed for SVOCs, metals, and pesticides, and one-half of the subsurface soil samples were analyzed for PCBs where black substances (asphalt pieces) were present. However, the depth of surface soil samples was not accurate in the note and the tense of the verbs in the note should have been past tense. The note was changed to the following:

"Note:
Samples were collected from depths of 0 to 0.5 feet for surface soil samples and 2 to bottom of fill for subsurface soil samples. All samples were analyzed for SVOCs, metals, and pesticides. One-half of the subsurface soil samples were also analyzed for PCBs. Subsurface samples analyzed for PCBs were selected from depths or materials that were oily or stained, or were dark in color."

10) **Section 4.4.1** – The TACO remediation objective for heptachlor is mistakenly given as 900 µg/kg. The residential objective is 100 µg/kg.

Response:

Agree. The TACO remediation objective for heptachlor has now been changed to 100 µg/kg.

11) **Section 4.4.2** – As in the Executive Summary, for lead, it lists the TACO residential ingestion remediation objective as both 400 and 800 mg/kg. The 800 mg/kg value is the TACO value for the Industrial Commercial ingestion soil remediation objective. The TACO value for the Construction Worker is 700 mg/kg.

Response:

Agree. Section 4.42 discussion for lead was changed and now reads as follows:

"Lead exceeded the TACO residential ingestion Soil Remediation Objective value of 400 mg/kg, the TACO construction worker ingestion Soil Remediation Objective value of 700 mg/kg, and the TACO industrial commercial ingestion Soil Remediation Objective value of 800 mg/kg at one of ten subsurface soil sampling locations, (i.e., NTC12SB29 at a concentration of 845 J mg/kg)."

12) **Section 4.5** – The last paragraph discusses the number of exceedances identified when the data are compared only to the TACO Residential and Industrial/Commercial ingestion and inhalation screening criteria. This is in contrast to the number of exceedances identified when the data are compared to the PALs which include the soil to groundwater criteria. The Agency understands this line of reasoning, but fails to see why the USEPA screening criteria are not included and discussed as well.

Response:

Agree with clarification. During the Site 12 RI, soil samples were collected and analyzed to provide the information required to characterize site conditions and conduct a human health risk assessment. The soil project action limits (PALs) were set at the lowest matrix-specific, risk-based or regulatory human health screening criteria appropriate for the site (i.e., TACO, Non-TACO, and USEPA screening criteria identified in Table 4-1). To be conservative, the Site 12 results were compared to the PALs in Section 4.3 to identify the nature of all contaminants that may be impacting Site 12. For comparison, a different screening approach was taken in Section 4.4 and the soil results were compared to TACO Ingestion and Inhalation Remediation Objectives (Residential and Industrial) to focus specifically on those chemicals that were detected at concentrations greater than the Illinois EPA regulations. Additional screening against specific USEPA screening criteria was not completed because further evaluation was completed during the human health risk assessment discussed in Section 6.

The last paragraph in Section 4.5 was meant to summarize the results of the two separate screening efforts in Sections 4.3 and 4.4, respectively. The paragraph was changed to the following:

"The initial screening of the surface and subsurface soil analytical results against the minimum screening criteria (PALs), as presented in Section 4.3, identified a number of contaminants in the soil that may be impacting Site 12. Metals, pesticides, PAHs, and non-PAH SVOCs were identified in the surface soil and metals, pesticides, PCBs, PAHs, and non PAH SVOCs were identified in the subsurface soil. However, as presented in Section 4.4, when the soil results were screened against the TACO Residential and Industrial Ingestion and Inhalation screening criteria, only PAHs, one pesticide (heptachlor), and lead were identified as potential issues in surface and subsurface soil."

13) **Table 4-1** – Several comments were generated pertaining to Table 4-1, the summary of regulatory screening values. Our specific concerns are listed below.

- The non-TACO Construction Worker ingestion screening value for aluminum should be corrected to 200,000 mg/kg.
- The TACO residential ingestion and TACO industrial/commercial ingestion entries for arsenic are given as "NC". TACO tables direct the user to use TACO Appendix A, Table G background values as the objectives. The lower background concentration of 11.3 mg/kg should be the screening value for each of the subject receptors.
- There currently are no non-TACO criteria for iron.
- The minimum TACO criterion for zinc should be 23,000 mg/kg.
- This table reports "NC" as the screening criteria for alpha-chlordane and gamma-chlordane. When not otherwise specified, chemicals with slight chemical variations but the same functional group should be summed and compared to the TACO objective for the functional group. Thus combined site concentrations of alpha- and gamma-chlordane should be compared to the TACO objective for chlordane. This practice also applies to endosulfan and endrin in the subject table.
- Non-TACO values are available for 2-methylnaphthalene.
- The non-TACO Class I soil to groundwater criterion for phenanthrene should be 210,000 µg/kg.
- Non-TACO residential and industrial/commercial ingestion values are available for dibenzofuran and should be included.
- Explain why the Table 4-1, USEPA-SSL inhalation column values do not always agree with the Exhibit A-1 and A-2 values in the SSL guidance (OSWER 9355.4-24, December 2002)
- Include columns for the USEPA-SSL ingestion values for the residential and industrial/commercial worker scenarios.
- Provide the details of the calculated USEPA-SSL construction worker ingestion and inhalation screening values presented in this table.
- Explain the sources of the USEPA-RSL screening values for acenaphthylene, benzo(g,h,i)perylene, and phenanthrene.

Response:

Agree. The table has been updated to address the requested corrections and changes.

14) **Section 4 Figures** – Suggest placement of the information boxes for each sample in the same relative location in all of the figures for ease of reference. For example, the information box for sample SB26 can be found in the northeast corner in Figure 4-7, in the center in Figure 4-8, on the western edge in Figure 4-9, etc…

Response:

Disagree with clarification. In general, information boxes were placed consistently on the figures based on sample locations (along eastern and western boundaries). The boxes are located as close to the actual sample locations as feasible without overlapping onto the Site and vary in size because of the number of parameters included in each box. The only information box that varies its location is the box for SB26 because it is located in the center of the site. The information box for SB26 was placed wherever practical due to the amount of parameters per location and the limited amount of space to place the boxes. No changes are proposed to the figures in response to this comment.

15) **Figure 4-15** – The note on the figure states that sample depths were from 0-6 feet. This should read from 0-6 inches, if the data are from the surface soil as the title states.

Response:

Agree. The note on Figure 4-15 has been changed to read "0-6 inches".

16) **Table 5-1** – Explain the last column in the subject table titled "Mobility Index". Is this an accepted indicator? Provide a literature reference explaining the rationalization for and usefulness of this factor.

Response:

The Mobility Index (MI) is an accepted indicator parameter that provides a quantitative assessment of contaminant mobility for organic compounds using water solubility, vapor pressure, and K_{oc} (Laskowski et al., 1983). The following scale was developed by Ford and Gurba (1994) to evaluate MI.

Relative MI	Mobility Description
> 5	Extremely mobile
0 to 5	Very mobile
-5 to 0	Slightly mobile
-10 to -5	Immobile
< -10	Very immobile

Table 5-1 was updated to include all available fate and transport information and the table describing MI ranges and descriptions were added to Section 5.2.

The following discussions regarding MIs were added to Sections 5.2.1.1 and 5.2.2:

Added to end of paragraph in Section 5.2.1.1: "Available mobility indices for PAHs range from -19.91 to -2.77. A chemical with a mobility index between -10 and 0 is considered to

be immobile to slightly mobile and a chemical with a mobility index less than -10 is considered to be very immobile."

New paragraph added to Section 5.2.1.1: "Available mobility indices for SVOCs range from -12.49 to 2.77. A chemical with a mobility index between -5 and 5 is considered to be slightly mobile to very mobile. A chemical with a mobility index less than -10 to -5 are considered to be immobile to be very immobile."

Added to end of first paragraph in Section 5.2.2: "Available mobility indices for pesticides range from -14.28 to -6.41. A chemical with a mobility index between -10 and -5 is considered to be immobile and a chemical with a mobility index less than -10 is considered to be very immobile."

Added to end of second paragraph in Section 5.2.2: "The mobility index for Aroclor-1254 is -11.7 and chemicals with a mobility index less than -10 are considered to be very immobile."

The following references were added to the Reference section:

Laskowski, D.A., C.A. Goring, P.S. McCall, and R.L. Swann, 1983. Environmental Risk Analysis for Chemicals. Van Nostrand Reinhold Company, New York, New York.

Ford and Gurba, 1994. Methods of Determining Relative Contaminant Mobilities and Migration Pathways Using Physical-Chemical Data.

17) **Section 6.3.1** – The first bullet item repeats the words "Soil Remediation Objectives."

Response:

Agree. The repeated words have been removed from the text.

18) **Section 6.3.3** – The third sentence in the third paragraph states that several of the USEPA-SSL construction worker screening values were exceeded. The sentence mistakenly includes naphthalene and mercury.

Response:

Agree. The references to naphthalene and mercury were deleted from the text.

19) **Section 6.4.3** – Include the USEPA, 1993 citation in the reference section of this report.

Response:

Agree. This reference has been added to the reference section.

20) **Section 6.4.4** – In the second paragraph, second bullet, first open bullet, the exposure point concentration is discussed for several receptors. The USEPA, 1993 guidance cited in Section 6.4.3 of this report, directs that the EPC for both the RME and the CTE should be the 95% UCL.

Response:

Agree. The text on p. 6-18 was revised to document that the 95% UCL was used for both the RME and CTE scenario and the risk assessment was updated accordingly.

21) **Section 6.4.5.1** – In the inhalation of dusts and vapors portion of this section, the last paragraph discusses two PEF values. The second value should be identified as to which receptors it was applied and the value should be corrected to a positive exponential (10^{+9}).

Response:

Agree. A description was added to the text to clarify that the second PEF applies to all receptors except Construction Workers. The exponent on the PEF was also corrected.

22) **Section 6.6** – The first paragraph in the subject section describes averaging cancer risks and non-cancer hazards across the two investigated depths. This is contrary to guidance. For instance, dust will not be generated from subsurface soil and volatiles are usually absent from surface soils. We suggest a method similar to that presented in Exhibit 3-1 of the Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (OSWER 9335.4-24, December 2002). Thus the soil ingestion EPC for the residential receptor will contain 20 sample results (10 surface plus 10 subsurface) and the dust EPC will contain only the ten surface soil results. Averaging the strata-specific risks and hazards as describe here is unacceptable.

Response:

Agree with clarification. The human health risk assessment was revised to present separate cancer risks and noncancer hazards for surface soil and subsurface soil in Tables 6-13 and 6-14 (risk summary tables for RME and CTE, respectively). Additional text was added to the uncertainty section to explain that adding surface and subsurface soil risks likely overestimates risk because 100% exposure is assumed for each of these media in the risk assessment.

Please note that the specific guidance cited (Exhibit 3-1, OSWER 9335.4-24, December 2002) is a recommendation for consideration of potential exposure pathways. The guidance text says, "The list of pathways for each scenario is not intended to be exhaustive; instead, each list represents a set of typical exposure pathways likely to account for the majority of exposure to soil contaminants at a site. The actual exposure pathways evaluated

in a soil screening evaluation depend on the contaminants present, the site conditions, and the expected receptors and site activities described in the CSM." Furthermore, this guidance is specifically for screening level evaluations, and this is a site-specific risk assessment.

Please also note that for current conditions of a hypothetical residential scenario, EPCs based on surface soil data only are relevant for both direct contact and inhalation pathways. Potential contact with subsurface soil is assumed for future conditions if excavation occurred for the construction of houses. The thrust of this comment pertains to the inhalation pathway, but the inhalation pathway contributes a very small amount to the total exposure and risk calculations. For example, the RME residential theoretical excess lifetime cancer risk from the inhalation pathway is $9x10^{-11}$ and the total residential receptor risk for surface and subsurface soil is $5x10^{-4}$; the RME residential HI from the inhalation pathway is 0.00005, while the total residential HI for soil is 0.4 (see Table 6-13). Thus, making the proposed changes to the risk assessment will have no substantive impact on the risk assessment results and conclusions.

23) **Section 6.6.1** – In the first paragraph of this section, the cancer risk range for TACO Tiers 1 and 2 are stated. This is repeatedly done in this document. Since this is a hybrid Tier 3 CERCLA evaluation, it is unnecessary to state and restate the risk criteria for TACO Tier 1 and 2 evaluations.

Response:

Agree. The references to the cancer risk goal for TACO Tiers 1 and 2 were removed from the text.

24) **Section 6.7.2.2** – This section discusses the uncertainty associated with the biased selection of sampling locations. In this case, the sample locations were fairly evenly spaced across the entire site. Except for the fact that there was a defined study area, the sample locations were not biased toward areas more likely to detect contamination. Therefore, the selection of sampling locations likely did not overestimate the risks to potential receptors, as is stated.

Response:

Disagree with clarification. During the RI, sample locations were generally evenly spaced across the site, but they were biased toward areas and depths most likely to detect contamination. Therefore, this biased sampling approach would potentially result in higher concentrations than a random sampling approach and an over estimation of site risks. No change is recommended.

25) **Section 6.7.4** – There are 33 different contaminants listed here and in Table 6-15 that were detected at levels exceeding the migration of soil to groundwater pathway screening values

in surface soil. There are 38 different contaminants listed here and in Table 6-16 that were detected at levels exceeding the migration of soil to groundwater pathway screening values in subsurface soil. That pathway is not considered in the risk assessment. It is understood that human exposure to groundwater at Site 12 is not expected due to the specifics of this site. However, there does not appear to be an analysis of the potential release of contaminants in the site 12 groundwater to a surface water body (Lake Michigan). Given the number of listed exceedances, the proximity of the lake, and the use of Lake Michigan water as a drinking water source, this pathway must be evaluated. As part of that evaluation, consideration should be given to the collection of at least a few groundwater samples to determine if the listed contaminants are actually leaching to the groundwater on site.

Response:

Disagree with clarification. To evaluate the potential for chemicals detected in surface and subsurface soil to impact groundwater, maximum chemical concentrations were compared to SSLs for migration to groundwater and the comparisons were presented in Tables 6-15 and 6-16, respectively. Migration to Groundwater SSLs are not used for COPC selection because quantitative risk assessments are typically based on direct contact with soil or particulates. There is no methodology available for quantitative risk evaluation of indirect exposure based on migration to groundwater. Therefore, it is not appropriate to select COPCs for quantitative risk evaluation for direct exposure on the basis of the indirect soil-to-groundwater pathway. The soil-to-groundwater SSLs provide an indication of potential impacts of contaminants in soil on groundwater quality, but are not indicators of quantitative risk, and therefore, the results of the soil-to-groundwater comparisons are only qualitatively discussed in the risk assessment.

To further evaluate the potential soil to groundwater migration issue for chemicals detected in surface and subsurface soil, Tables 6-15 and 6-16 were updated to include the following additional screening criteria:

- Illinois background concentrations for PAHs and inorganics
- pH-specific TACO for Migration to Groundwater – Class I for inorganics
- Surrogate TACO for Migration to Groundwater – Class I for several semivolatiles and pesticides
- SSLs based on dilution and attenuation factors of 20

Based on the new evaluation of surface soil data against all criteria in Table 6-15, only 8 of the 33 contaminants originally identified remain a concern based on the initial screening. Four are pesticides (alpha-BHC, beta-BHC, delta-BHC, and dieldrin) and four are inorganics (cobalt, iron, lead, and manganese). Based on the mobility indices included in

the revised Table 5-1 (all less than -6.4), the four pesticides are not expected to be mobile in the environment and should not present a soil to groundwater migration concern. The maximum and average concentrations of cobalt, iron, and manganese are generally at the Illinois background concentrations for these inorganics and they should not present a migration concern. The maximum and average lead concentrations are below 400 mg/kg (TACO for Residential Ingestion), a typical remedial goal for lead in soil; therefore, lead in surface soil should not be a migration concern. Therefore, based on further evaluation, no chemicals in surface soil should present a soil to groundwater migration concern. The additional evaluation of surface soils and the conclusions will be incorporated into Section 6.7.4.

Based on the new evaluation of subsurface soil data against all criteria in Table 6-16, only 10 of the 38 contaminants originally identified in Table 6-16 are still considered soil-to-groundwater pollutant mobility concerns based on the initial screening. One is a SVOC (carbazole), two are PAHs (benzo(a)anthracene and benzo(b)fluoranthene), two are pesticides (alpha-BHC and dieldrin), and five are inorganics (cobalt, iron, lead, manganese, and selenium). Based on the mobility indices included in the revised Table 5-1 (all less than -7.6), the five organics are not expected to be mobile in the environment and should not present a soil to groundwater migration concern. The maximum and average concentrations of cobalt and manganese are generally at the Illinois background concentrations for these inorganics and they should not present a migration concern. Therefore, based on further evaluation, iron, lead, and selenium in subsurface soil are the only chemicals to be retained as soil to groundwater migration contaminants of concern. The additional evaluation of subsurface soils and the conclusions will be incorporated into Section 6.7.4.

The Navy proposes to resolve the three remaining soil to groundwater pollutant mobility contaminants of concern by collecting additional subsurface soil samples and performing SPLP-inorganics analysis on the samples. The results and their evaluation will be incorporated into an addendum to the RI report.

26) **Section 6.7.4** – It should state at the end of this section that omitting the soil to groundwater data from the risk assessment, with numerous exceedances of the screening levels, may well underestimate the risks to potential receptors.

Response:

Disagree. See the Response to Comment No. 25. The results of the human health risk assessment would not change because of the soil-to-groundwater exceedances discussed in Section 6.7.4. Soil to groundwater pollutant mobility contaminants of concern are not included in the quantitative human health risk assessment.

27) **Table 6-1** – The calculation of the "BAP EQUIVALENTS" has been an unending dilemma at NSGL sites. In the subject table, on page 1 of 6, the BAP equivalents maximum result is reported as 2083.63 µg/kg. Applying the USEPA order-of-magnitude relative potency factors to the concentration data on this table for the seven carcinogenic PAHs, we derive a value of 2247.7 µg/kg. However, there are several ways this value could be derived. The method to calculate the BAP equivalent values should be clearly stated such that we can confirm their accuracy.

Response:

USEPA adopted a Toxicity Equivalence Factor (TEF) approach to evaluate potentially carcinogenic PAHs based on the potency of each compound relative to that of BAP. TEFs for the individual carcinogenic PAHs are as follows:

Compound	TEF
Benzo(a)pyrene	1.0
Benzo(a)anthracene	0.1
Benzo(b)fluoranthene	0.1
Benzo(k)fluoranthene	0.01
Chrysene	0.001
Dibenzo(a,h)anthracene	1.0
Indeno(1,2,3 cd)pyrene	0.1

The TEFs are used to convert each individual carcinogenic PAH concentration into an equivalent concentration of BaP (BAP Equivalent concentration = Result x TEF). The individual BAP equivalent concentrations are then summed to produce a total BAP Equivalent concentration for each sample. A BAP Equivalent is calculated for each sample. For the BAP Equivalent-fullnd, the PAHs with non-detects (result with the U qualifier) used the full method detection limit concentration (result with the U qualifier) for the calculation using the TEFs. This practice was used uniformly for each sample (it was simply not repeatedly footnoted). The BAP Equivalents are treated the same as the rest of the chemical parameters, i.e., the maximum detected BAP Equivalent concentrations are used to calculate the EPC, etc. in the risk assessment and the results are compared to the ICLR.

28) **Table 6-9** – Several comments apply to this table of non-cancer oral/dermal toxicity values.

- The RfD for manganese should be corrected to 2.0E-02 mg/kg/day. The IRIS entry clearly states that a modifying factor of three should be applied to the RfD when evaluating non-dietary exposures. An additional modifying factor of two is suggested to account for increased bioavailability from non-food sources.
- The RfD for metallic vanadium should be used. It is available in the PPRTV literature.

- The ATSDR subchronic RfD for aluminum is listed as 1.0E+00 mg/kg/day.
- The subchronic RfD for arsenic cannot be confirmed. HEAST gives a value of 3.0E-04 mg/kg/day.
- ATSDR gives a subchronic RfD of 5.0E-03 mg/kg/day for chrome VI.
- Subchronic RfDs are available for many more chemicals than listed in this table. ATSDR provides subchronic RfDs for naphthalene, chlordane, heptachlor, barium, cadmium, and copper. The PPRTVs provide values for antimony, cobalt, iron, and vanadium. The IRIS chronic RfD is based on a subchronic study which should be used.
- Any RfD change, chronic and subchronic, will require a corresponding change in the dermal RfD value.

General Response to Comment 28:

Many of Illinois EPA's chemical-specific toxicity criteria comments represent clarifications of the chemical-specific Tier 3 toxicity criteria sources (e.g., PPRTV and ATSDR) that Illinois EPA recommends. Furthermore, Illinois EPA's recommendations relate primarily to subchronic RfD values (for exposure durations that are 7 years or less), which apply only to the construction scenario. Please note that if a specific subchronic RfD was not listed in Table 6-9, the chronic RfD was applied in the risk assessment of subchronic exposure scenarios. In general, changing these toxicity values would have little impact on risk characterization summaries and certainly not on remedial action decision-making. Therefore, the level of effort required to quantitatively revise the Site 12 Risk Assessment to address these comments is not warranted. Rather, the differences in the Illinois EPA recommended toxicity values will be addressed in the uncertainty section of the Site 12 risk assessment. The following section will be inserted into the Uncertainty Analysis section of Section 6 of the SI Report.

> "6.7.5.2 Impact on Risk Characterization if Illinois EPA Additional Toxicity Criteria Were Applied
>
> During its review of the draft of this HHRA (Illinois EPA, 2011), Illinois EPA proposed a number of alternative toxicity criteria, primarily subchronic RfD from Tier 3 toxicity resources (per USEPA, 2003). Many of Illinois EPA's chemical-specific toxicity criteria comments represent clarifications of the chemical-specific Tier 3 toxicity criteria sources (e.g., PPRTV and ATSDR) that Illinois EPA recommends. Summarized below is a comparison between the toxicity criteria that have been applied in the risk assessment and those additional toxicity values proposed by IEPA. This analysis is presented in its entirety at the end of Appendix F. As indicated by this evaluation, there would not be substantive changes in the overall risk characterization nor risk decision-making if the alternative IEPA values are used.

Appendix F Uncertainty Table 1 presents the chronic and subchronic toxicity values proposed by Illinois EPA compared with these values that were used in the Site 12 risk assessment. For a number of COPCs, Illinois EPA's proposed subchronic oral reference doses, Tier 3 subchronic toxicity values, and RfCs/RfDs are higher than the values that were used in the Site 12 RA (that is, the IEPA proposed toxicity factors are less conservative than those used in the Site 12 RA). These include chronic and subchronic RfD for TCDD, subchronic RfD for naphthalene, α-chlordane, γ-chlordane, and cobalt. Therefore the risks calculated for subchronic scenarios (i.e., the construction scenario) are more conservative in the Site 12 RA than if these subchronic values are applied for these COPCs. A number of the proposed Illinois EPA RfD values are the same as those used in the Site 12 risk assessment. These include the subchronic RfD for antimony, barium, and iron. There would be no change to the risk calculations in response to the comments on these chemicals. For another group of COPCs, the proposed Illinois EPA subchronic RfD from a Tier 3 source was lower (that is more conservative) than the chronic RfD from Tier 1 source IRIS. These include heptachlor, heptachlor epoxide, cadmium, copper, and mercury. Therefore, we propose that retaining the chronic RfD from IRIS as a surrogate for a subchronic RfD in these two cases. Finally, there were a number of Illinois EPA's proposed toxicity values that are more conservative than those used in the Site 9 RA. These include the chronic RfD for manganese and vanadium, and the subchronic RfD for aluminum and arsenic.

In the Uncertainty Analysis in Appendix F, side-by-side comparisons were made between some original risk spreadsheets and spreadsheets modified with the Illinois EPA toxicity values. The scenarios evaluated are construction (i.e., the only scenario in which subchronic RfD values were applied) and the child residential scenario (a receptor who is more sensitive for evaluating noncancer exposures), Table 7.1 (Construction worker noncancer hazard from oral and dermal exposure to surface soil) shows the original HI calculated is 0.4. When all of the proposed Illinois EPA RfD values are applied, there is a slight increase in the summed HI for this receptor (0.6), but this is still an acceptable noncancer risk result (i.e., there is no change to the remediation decision based on these changes). The original Table 7.3 (Construction worker noncancer hazard from ingestion and dermal exposure to subsurface soil) summed HI is 0.6 while the revised spreadsheet with Illinois EPA subchronic RfDs have a higher HI (1.0), but this is still an acceptable risk result. For the hypothetical child residential receptor, Table 7.12 calculates noncancer hazards for exposure to surface soil through ingestion and dermal contact, and "Uncertainty Table 7.12" shows the noncancer hazard calculations with the IEPA proposed values. While the IEPA toxicity values yield a higher HI, there is no change in remedial strategy because both summed HIs are greater than 1 (HI of 2 and 3, respectively for original and IEPA toxicity values). Likewise, the HI for the hypothetical child residential receptor from exposure to

> subsurface soil (HI of 4.58) is slightly higher with the proposed Illinois EPA RfD values compared to the HI presented in the Site 9 Risk Assessment (HI of 4). However, the original HI is in excess of 1, and the same remedial decision would be supported with modification of the RfD values.
>
> In summary, the summed HIs for the construction worker and residential child yield the same remedial decision when the Illinois EPA toxicity values are applied compared to the summed HIs in the Site 12 RA. Therefore, changing these toxicity values would not result in substantive changes in the overall risk characterization nor risk decision-making, if the alternative Illinois EPA values are used."

Please see Appendix F, which provides the additional tables discussed in the proposed uncertainty analysis text above.

For future risk assessments, may we suggest the following procedure: After COPCs are identified for a risk assessment but prior to commencing with risk calculations, the Navy will provide Illinois EPA with the proposed toxicity criteria (chronic and subchronic oral RfD and inhalation RfC; oral cancer slope factors; and inhalation unit risks). We will request that Illinois EPA provide concurrence on these values, or recommend alternative values before further preparation of the risk assessment is made.

Bullet 1: The approach presented in the comment is not explicitly described in the IRIS for manganese; therefore, we do not propose to change the risk calculations of the Site 12 Risk Assessment based on this comment. However, we recognize that the User Guide to the USEPA Regional Screening Levels does prescribe subtracting the daily dietary contribution of manganese from the RfD (0.14 mg/kg-day/2 = 0.07 mg/kg-day), and then adjusting the new RfD for nondietary exposures by the modifying factor of 3 (0.07 mg/kg-day/3 = 0.023 mg/kg-day). Therefore, we agree to discuss this in the uncertainty section of the Site 12 report, and in future risk assessments to apply the chronic oral RfD (and subchronic per "manganese RfDs" comment above) for manganese to 0.02 mg/kg-day.

Bullet 2: It should be noted that one of the key differences between PPRTV values and IRIS values is the opportunity for public review and comment of draft IRIS values before they are finalized. No such unsolicited review is included for PPRTV values. Our review of the provisional toxicity criteria document referenced here shows that there is low confidence in the key study (Boscolo et al., 1994, which is also a subchronic study rather than chronic study) and therefore low confidence in the provisional subchronic and chronic RfDs. There is an uncertainty factor (UF) of 3000 applied to the No Observed Adverse Effects Level (NOAEL) to yield the very low provisional chronic RfD of 0.00007 mg/kg-day. The toxic effect (kidney cellular changes) was observed only in male rats, and this may be a gender/species-specific toxic effect and is common for male rats.

Recently the USEPA RSL guidance (May 2011) proposes the following approach to calculating a RfD for vanadium compounds other than pentoxide. According to the User Guide Section 5.4, "(t)he oral RfD toxicity value for Vanadium, used in this website, is derived from the IRIS oral RfD for Vanadium Pentoxide by factoring out the molecular weight (MW) of the oxide ion. Vanadium Pentoxide (V205) has a molecular weight of 181.88. The two atoms of Vanadium contribute 56% of the MW. Vanadium Pentoxide's oral RfD of 9E-03 multiplied by 56% gives a Vanadium oral RfD of 5.04E-03." We propose no change in the risk calculations of Site 9, but to discuss in the uncertainty section the potential impact on the risk assessment conclusions if 0.005 mg/kg-day were applied as the oral RfD for vanadium. In future risk assessments, we propose to use the oral RfD of 0.005 mg/kg-day for vanadium.

Bullet 3: Response regarding Aluminum subchronic RfD: The reviewer is correct. The ATSDR intermediate MRL was revised from 2 mg/kg-day to 1 mg/kg-day. In future risk assessments, the most recent subchronic RfD for aluminum will be applied. The impact on the risk assessment of using the older subchronic RfD for aluminum is addressed in the Uncertainty Section of the Risk Assessment, and presented in a quantitative comparison in Appendix F tables to the RI Report.

Bullet 4: The subchronic RfD is found in USEPA Region 8 (2002) "Derivation of Acute and Subchronic RfD for Inorganic Arsenic." This paper has been included with this Response to Comments document. The reference in Table 6-9 will be changed to this Tier 3 source. However, we will include use of this value or the IEPA subchronic RfD in the uncertainty analysis, as discussed in the general response to this comment above.

29) **Table 6-10** – Several comments are directed at the subject table of non-cancer inhalation toxicity values.

- It is inappropriate to convert the naphthalene RfC to an inhalation RfD.
- The RfC for mercury is given in IRIS as 3.0E-04. A corresponding change should be made to the inhalation RfD.
- The RfC in this table for vanadium is for vanadium pentoxide. No RfC is currently available for vanadium metal.
- Subchronic RfC values can be identified for most of the listed chemicals. For those chemical for which no subchronic inhalation value can be determined, the chronic toxicity value should be used.

Response:

See General Response to Comment No. 28.

Please note that all inhalation RfDs have been removed from Table 6-10 as more recent USEPA guidance on inhalation risk assessment applies a RfC (mg/m^3) rather than an inhalation RfD (mg/kg-day) in the risk characterization step.

Please refer to Appendix F Uncertainty Table 2 for a presentation of subchronic RfC that could have been applied in the risk assessment, and comparison with the chronic values that were used. In most cases where there is a subchronic RfC (or "intermediate" value from ATSDR), the value used in the original risk assessment is more conservative. One difference is for chlordane, but in this case the ATSDR intermediate RfC is more conservative than the chronic RfC. Therefore, no change is recommended for this toxicity value.

30) **Table 6-12** – A few comments arose from the table of inhalation cancer toxicity values.

- California EPA provides a cancer unit risk value of 3.4E-05 for naphthalene.
- The URF for vanadium is for vanadium pentoxide. No URF is currently available for vanadium metal.
- Conversion to inhalation slope factors is inappropriate if the target organ is part of the respiratory system (airway or lungs).
- Explain the inclusion of "TCDD TEQs" in this table.

Response:

See General Response to Comment No. 28.

Bullet 1: Because this is a California-specific value, it is not appropriate to use in the risk assessment of a Site in Illinois and USEPA Region 5.

Bullet 2: There is no process knowledge or historical waste disposal information to support that vanadium pentoxide (V_2O_5) is a predominant form of vanadium detected in soil samples. Therefore, a discussion on the conservatism of including vanadium in the inhalation risk calculations of the Site 12 risk assessment was added. In future Naval Station Great Lakes risk assessments, toxicity values for vanadium and compounds other than vanadium pentoxide will be used.

Bullet 3: Please note that all inhalation slope factors have been removed from Table 6-12 as more recent USEPA guidance on inhalation risk assessment applies an inhalation unit risk (per ug/m^3) in the risk characterization step.

Bullet 4: TCDD TEQs were an artifact from another report and have been removed from Table 6-12.

31) **Figure 6-1** – The conceptual site model (CSM) does not account for the soil to groundwater exposure route. It is understood that exposure route is not part of the risk assessment calculations, but that route is still relevant. There are numerous exceedances of the screening levels. The CSM must account for all possible exposure scenarios at the site.

Response:

Agree with clarification. It was agreed during preparation of the SAP that groundwater was not going to be evaluated for human receptors. However, to account for the soil to groundwater exceedances discussed in the comment, the soil to groundwater exposure route was added to Figure 6-1, but it was labeled as an incomplete pathway because groundwater is not used as a drinking water source and human receptors would not be exposed.

32) **Section 7.0** – The ecological risk assessment is very weak. This assessment lacks a clear definition of what is being protected. A biologic inventory should be performed to identify threatened and endangered species and any sensitive habitats. This area appears to be a rather low grade terrestrial habitat but that conclusion is never reached in this report. The focus is directed to the sediments and benthic organisms yet there is neither analytical sampling nor biological sampling.

Response:

Although the ecological risk assessment (ERA) was conducted in the manner that was agreed to in the responses to Illinois EPA comments on the draft SAP and in accordance with the final SAP, the ERA will be expanded as follows:

- Additional information will be provided in Section 7.1.1 to describe the poor ecological habitat at this site. Based on the low quality habitat at the site, it is not likely that there are any threatened or endangered species or any sensitive habitats are present at the site. Information from the April 2010 Integrated Natural Resources Management Plan for Naval Station Great Lakes will be included in Section 7.1.1.

- The ERA will add terrestrial plants, invertebrates, mammals, and birds as assessment endpoints and will evaluate potential risks to those receptors,

- The evaluation of potential risks to benthic invertebrates from contaminants in soil if it were to erode from the site and migrate to Lake Michigan will be retained in the ERA.

33) **Section 7.1.5** – In the first paragraph, the rationale for comparing soil concentration data to sediment screening values is given. This approach is inappropriate. This process does not assess current conditions nor can it possibly predict future contaminant levels.

Response:

The Navy agrees that this is a very conservative approach that would overestimate potential future exposure to sediment invertebrates. However, this assessment was conducted based on comments from Illinois EPA on the draft SAP. The Navy only evaluated this pathway at the request of Illinois EPA. Also, please see that Navy's Response to Comment No. 32.

34) **Section 7.1.5** – In the second paragraph there is a reference to samples collected in 2006 and 2007 to be used as background sediment samples. The sample analysis results for those samples are included in Table 7-1. However, there is no reference included for that data. There is also no mention of who collected those samples, where they were collected, how they compared to other background samples, or if that data has been validated. Illinois EPA cannot agree to the use of those samples for comparison as background without being allowed to conduct a complete review of the data. Furthermore, if none of the previously-collected data is being used for the risk assessment, how is it that those samples can be used for a background comparison? (These samples are again referenced in Section 7.3 as well.)

Response:

Available information on the background sediment samples collected in 2006 and 2007 will be added to Section 4 of the report, including who collected the samples, where they were collected, and if the data were validated. The samples were collected in the outer harbor as part of the Great Lakes Naval Station's harbor dredging project. The samples were evaluated in the ERA not as true "background" samples, but as samples representative of chemical levels that are already present in Lake Michigan near Site 12. Therefore, because the chemical concentrations in the nearby sediment samples in the harbor are acceptable, there should not be a concern if chemicals with similar or lower concentration in the soil at Site 12 migrate to the sediment. Section 7.1.5 will be modified as follows to address this comment:

> "The chemical concentrations in surface soil were also compared to the maximum concentration detected in select sediment samples collected in 2006 and 2007 in the outer harbor as part of the Great Lakes Naval Station's harbor dredging project (see Section 2.0 for more discussion of these samples). The selected samples were collected from locations closest to Site 12 and consist of samples 1, 2, and 11 collected on 6/15/2006 and sample 37 collected on 6/14/2007. Samples 1, 11, and 37 were comprised of sand from a depth of 3 to 5 feet. Sample 2 was comprised of muck from a depth of 2 to 7 feet on top of 1 to 5 feet of sand and sand/sit/clay mixture. These

outer harbor samples were not considered true "background" samples, but the analytical results from those samples represent chemical levels present in Lake Michigan near Site 12. Therefore, there should not be a concern if chemicals with similar or lower concentration in the soil at Site 12 migrate to the sediment. Appendix E-3 presents the analytical results for the outer harbor samples along with a map showing the sample locations. The maximum concentrations from the background sediment samples are presented in Table 7-1."

35) **Section 7.3** – The final sentence in the third paragraph of the subject section is confusing. It states that pesticides were not detected in the sediment; however, the only sediments sampled and analyzed were the background samples. It also implies that pesticide contamination resulting from authorized historical uses is acceptable. In a risk assessment, it is the concentration-based risk that determines acceptability not the intended use of the contaminant.

Response:

The statement was meant to indicate that because the source of the soil at the site was dredged sediment, if elevated levels of pesticides were not detected in the sediment than the pesticides are likely from a different source (i.e., from typical application). However, the statement will be deleted because chemical data for the actual dredged material is not available. Additional text will be added to the paragraph to indicate whether the pesticides are likely to result in adverse risks to sediment invertebrates. It should be clarified that chemicals not related to site activities should not be retained as final COCs. Also, note that the word "sediment" in the first sentence of the referenced paragraph will be changed to "surface soil."

36) **Table 7-1** – The NOAA reference provides a freshwater sediment screening level of 460 mg/kg for manganese.

The rationale for maintaining vanadium as a sediment COPC is given as background. Background data should be provided so this can be confirmed.

Response:

The freshwater screening level of 460 mg/kg from the NOAA reference will be added to Table 7-1. Please see the Response to Comment No. 34 regarding the background comment.

37) **Table 7-2** – The text should include the observation that the concentration of over one-half (14 of 27) of the contaminants listed on this table are over their respective PEC. Also noteworthy is that the PEC is the probable effect level which is defined as, "the concentration above which adverse effects are expected to frequently occur."

Response:

Agree with clarification. The Navy will include a summary paragraph which indicates that concentrations in multiple samples are greater than their respective PECs and will add a table to show this. The table will also show a comparison of the average chemical concentrations compared to the PEC, because should erosion of the soil occur, it would occur over the site. Note that all of the PECs were not exceeded in the same sample. The definition of the PEC will also be added to the text.

38) **Table 7-2** – The entry for heptachlor should be corrected to 16.0 µg/kg.

Response:

Agree. The value for heptachlor was corrected to 16 µg/kg.

39) **Section 8.1** – In the first paragraph, the fourth bullet, the TACO residential ingestion value should be corrected to 100 µg/kg.

Response:

Agree. The correction was made.

40) **Section 8.1** – Please explain in more detail why the TACO residential and industrial/commercial ingestion and inhalation screening values are repeatedly used for comparison, rather than the PALs.

Response:

Section 8.0 has been revised to reflect the changes made to the Executive summary that address the discussion of both the screening criteria utilizing the PALs and TACO. In response to this comment, a comparison to PALs has been added to Section 8.1, the RI summary.

41) **Section 8.2** – 35 Ill. Adm. Code 742.915 outlines several elements to include in a TACO-based appeal for cancer risks in excess of 10^{-6}. It would be supportive to address these elements in the conclusions section of this report.

Response:

In response to this comment, the following text has been added to Section 8:

8.2.4 Addressing 35 Ill. Adm. Code 742.915

As stipulated in 35 Ill. Adm. Code 742.915, in order to support the application of a risk target range of 10^{-4} to 10^{-6}, the following factors need to be addressed: sensitive populations, number of receptors affected, duration of risk at different target risk levels, and chemical characteristics.

Of the receptors evaluated in the HHRA, a residential child would be considered a sensitive receptor, though residential land use is hypothetically considered, and highly unlikely. The calculated summed risk and noncancer HI exceed the Tier 3 risk range for a hypothetical residential child. None of the other receptors for Site 12 would be considered sensitive receptors. The other receptors evaluated in the HHRA are a fulltime maintenance/industrial worker, construction worker, recreational/trespasser adolescent and adult receptors, and residential adult.

Numbers of receptors affected is low given that Site 12 is a relatively small area that is not frequently used. The duration of risk assumed for receptors with summed risks within the TACO Tier 3 risk range is long-term (e.g., 25 years for future full-time worker, 10 years for adolescent recreational/trespasser, 24 years for adult recreational/trespasser, 24 years for residential adult), and likely these are conservative assumptions for a Navy base and for the anticipated future land use.

Finally, with regard to chemical characteristics, a key observation is that c-PAHs and arsenic, the COPCs that contribute most to summed risks that exceed 1×10^{-6}, are generally within Illinois background levels for counties within metropolitan areas. The 95% UCL of B(a)P equivalents for surface soil is 1.37 mg/kg compared with the Illinois background value of 2.1 mg/kg (IEPA, 2007; Appendix A, Table G). The 95% UCL of arsenic in surface soil is also lower than the Illinois background value (11.4 mg/kg compared with 13 mg/kg). Therefore, applying the Tier 3 risk range of 10^{-4} to 10^{-6} is reasonable for the maintenance/industrial worker and recreational/trespasser receptor, given that a significant portion of the summed risk that exceeds 1×10^{-6} is attributable to background levels.

42) **Section 8.2** – This section is supposed to present the conclusion(s) drawn from the results of the risk assessment. There is discussion of the data as compared to the published background values and a brief mention of the established contaminants of concern (COCs), but little in the way of drawing a conclusion. The report should conclude that there are unacceptable risks, both current and future, for exposure to the contaminants at this site which will need to be addressed in some manner. It should also conclude that, although not part of the risk assessment, there are numerous exceedances of the screening values for the soil to groundwater pathway. Those exceedances will need to be addressed as well.

Response:

This section has been revised and incorporates the HHRA summary from Section 6.8.

Regarding the soil to groundwater pathway, see the Response to Comment No. 25. These contaminants are not considered in the quantitative risk assessment, but will be carried forward for further evaluation in the FS. Text was added to document this approach.

43) **Section 8.4** – This section needs to be completed. Illinois EPA suggests a meeting be conducted between the Navy and Illinois EPA to determine the next step in this investigation and subsequently, what the recommendation for this site should be.

Response:

Agree. A draft final version of the RI Report will be prepared to resolve Illinois EPA's comments. A meeting between the Navy and Illinois EPA will be scheduled after the draft final RI Report is submitted and Illinois EPA has had sufficient time to review the report.

44) **Appendix B-4** – The chain-of-custody records have not been filled out correctly. Numerous revisions and changes have been made without the proper notations, i.e. initials and dates, etc. There are no received by signatures and dates upon receipt at the laboratory. Both pages are listed as 1 of 2, yet they are numbered consecutively.

Response:

Agree. Revisions to the chain-of-custody were not done correctly by field personnel. This issue has been noted and procedures have been corrected so that this does not happen during subsequent field work. A copy of the final chain-of-custody received and signed by the laboratory has been incorporated into Appendix B-4. Even though there were administrative errors on the chain-of-custody forms, they did not impact the custody of the samples or the quality of the analytical results.

45) **Appendix F –** There is an untitled table following Table 8.5a, which appears to discuss one, or more, past investigations at a number of subareas. Those subareas are listed as a concrete pad, loading dock, debris pile, and suspected disposal pit. There is no explanation for when, where, or how those investigations were conducted. Chemicals of potential concern (CPOCs) are listed, but no data is provided regarding contaminant concentrations. Please identify what is being presented on this table and explain how it is relevant to the investigation of Site 12.

Response:

No untitled table was intended to follow Table 8.5a. This must have been included accidently in the review copy of the report. It was deleted.

46) **General Comment –** Due to the nature of some of our comments concerning the exposure assumptions and toxicity values, the Agency reserves our review of the actual risk calculations until agreement has been reached on the above factors.

Response:

Comment noted. The risk assessment will be revised based on the responses included in this document and re-submitted to Illinois EPA for review and concurrence as part of the draft final version of the RI Report.